P 341

EFFECT OF ISCHAEMIA ON SEROTONIN NEURONES IN THE RABBIT RETINA.

CAZEVIEILLE C. and OSBORNE N.N.
Nuffield Laboratory of Ophthalmology, University of Oxford, Oxford OX2 6AW, U.K.

Serotonin is normally not present in sufficient concentrations in the rabbit retina for localisation by immunohistochemistry. The amine is taken up by a population of amacrine cells in the intact retina and in primary retinal cultures and can be viewed with immunohistochemistry. Accumulated serotonin is released by kainate and AMPA in a dose dependent range and these processes are inhibited specifically by CNQX. NMDA, ACPD and APB did not cause a release of the accumulated serotonin. These data show that the serotonin neurones contain kainate/AMPA type receptors.

Exposure of primary retinal cultures to kainate for a specific period or injection of kainate into the eye affected the serotonin cells in that they were eventually unable to accumulate exogenous serotonin. These data suggest that the kainate caused metabolic "death" to the serotonin cells. However, exposure of retinal cultures in glucose free medium and an absence of oxygen for 6 hours to induce ischaemia only affected some of the serotonin cells as a few of these neurones still had the capacity to accumulate the amine. Similar data were determined for the intact retina where the intraocular pressure was raised above the systolic blood pressure for 90 min but even after a reperfusion time of 6 days a few cells still accumulated serotonin. The combined data suggest that the rate of death of a serotonin cell due to ischaemia is dependent on the number of kainate/AMPA receptors present.

Acknowledgements: We are grateful for support from the EC.

P 342

GLUTAMATE IS NOT RELEASED FROM RABBIT RETINA UNDER ACUTE ISCHEMIA

BONNE C.[1], VILLAIN M.[2,3] and MULLER A.[1]

[1] Lab. Physiologie Cellulaire, Université Montpellier I, [2] Dept. Ophtalmologie, CHU Montpellier and [3] INSERM U336, Montpellier (France).

Purpose : It has been reported that extracellular glutamate concentration was increased in ischemic brain and in the vitreous of glaucoma suffering patients and animals. The purpose of this study was to investigate glutamate accumulation in acute retinal ischemia in the rabbit.

Method : Sedated male Burgundy rabbits were given general anesthesia with urethane 25% injected intraperitoneously. The anaesthetised animals were placed in a lateral recumbent position and a microdialysis superfusion probe was implanted into the eye through the pars plana. The microdialysis monoprobes were obtained from Phymep (Paris). The length of the tubing was 2 cm with a 2 mm microdialysis membrane and the molecular weight cutoff for the dialysis tubing was 3,000. Saline was perfused at 6 µl/min, microdialysate samples collected for 10 min and analysed for aminoacid content by HPLC/fluorimetry of O-phthaldialdehyde derivatives. Ischemia was induced by increasing intraocular pressure (HIOP) to 100 mmHg by anterior chamber perfusion or by optic nerve ligature.

Results : When retinal ischemia was induced for 45 or 90 min by HIOP or for 45 min by optic nerve ligature, no significant increase in glutamate concentration was observed in microdialysate samples during the ischemic period as well as at reperfusion. By contrast alanine and glycine were released depending on free radical generation.

Conclusion : Acute ischemia of rabbit retina does not induce any glutamate accumulation in extracelullar spaces by contrast to chronical experiments previously reported.

P 343

PATHOPHYSIOLOGICAL INTERPRETATION OF RETINAL MICROCIRCULATION BASED ON A SIMULATION MODEL

BACHMANN K. VILSER W. RIEMER TH. PIETSCHER S. KÖNIGSDÖRFFER E. and STROBEL J.
Friedrich Schiller University Jena (Germany)
Department of Ophthalmology

Purpose
In the last years the retinal microcirculation was discussed controversially. Since it is possible to measure some parameters of the retinal microcirculation with a stuff of different new techniques some different point of views were described which tried to interpretate the retinal microcirculation. Nevertheless many questions could not be answered. Based on anatomical and pathophysiological facts but also on results of new measurement techniques a simulation model of retinal microcirculation was created which perhaps could give some answers to these questions.

Methods
The simulation model of the retinal microcirculation was used to simulate normal physiological but also some pathophysiological situations. In this way the model could give different aspects for different parts of the retinal vessel system that was divided into five parts for each retinal quadrant: arteries, arterioles, capillaries, veinoles and veins.

Results
The reaction of the different parts of the retinal vessel system to special physiological and pathophysiological situations can be very different.

Conclusions
It seems that the retinal microcirculation system has to be interpreted in a new and a very different way. The various parameters of the retinal microcirculation should be defined clearly. The role of the so-called autoregulation of the retinal micro-circulation should be discussed new.

Supported by BMFT : 01 IN 202 C

P 344

INTRAINDIVIDUAL REPRODUCIBILITY IN REPEATED MEASU - REMENTS OF ARTERIAL BLOOD VELOCITY AND BLOOD FLOW OF NORMAL HUMAN SUBJECTS BY MEANS OF SLO - FLUORESCEIN - ANGIOGRAPHY

BRÄUER - BURCHARDT CH.[1] MÜNCH K.[1] VILSER W.[1] and WOLF S.[2]
[1] Friedrich Schiller Univ. Jena (Germany), Dept. of Ophthalmology
[2] Department of Ophthalmology of the RWTH Aachen (Germany)

Purpose: Recently the methods of blood flow measurement had been permanently developed. A high effort in technical equipment and time in the case of fluorescein techniques prevented until now a repeated execution of measurements and a sufficient consideration of the random error and the reproducibility.

Methods: A new method with reduced systematic error and low technical effort for the automatic determination of the blood flow parameters taken from videotapes of fluorescein angiographies was developed. It connects adaptive algorithms with methods of digital image processing and signal analysis. In examinations of the accuracacy several influences to the random error were conscientiously considered. In result of the measurements normal values of the blood blow for healthy persons were obtained.

Results: In repeated measurements 46 vessels of eight young healthy persons were examined. The intraindividual coefficient of variation was 18.6% for the arterial blood velocity and 19.6% for the blood flow respectively.
Between the subjects a mean arterial blood velocity in the branch vessels of 13.1 ± 4.1 mm/s and a mean total blood flow of 0.535 ± 0.150mm³/s was determined.

Conclusions: The gap between the different results of LDA- and indicator technique could be closed by the new methods. The results for the reproducibility lie in the expected range and are still improvable after some correction of the technical equipment.

Supported by BMFT : 01 IN 202 C